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February 6, 2002

Mr. Joe Mollusky
Port of Portland
Property and Development Services
121 NW Everett
Portland, Oregon 97209

Re: Feasibility Study Scoping Document
Port of Portland Terminal 1 South
Portland, Oregon
ECSI # 2642

Dear Mr. Mollusky:

This letter documents the proposed scope of the feasibility study (FS) for the Port of Portland Terminal 1 South Site (T1S Site) in Portland, Oregon (Figure 1). The purpose of the FS is to develop and evaluate potential remedial action alternatives for contaminants of concern (COCs) in the affected media and to recommend an alternative for implementation at the site. In this letter, we identify the overall scope of work for the FS and present the remedial action alternatives proposed for detailed evaluation.

GENERAL SCOPE OF WORK

The FS will be completed in accordance with OAR 340-122-085 through -090 and the Department of Environmental Quality (DEQ) guidance for conducting feasibility studies (Guidance for Conducting Feasibility Studies, July 1, 1998). The FS will use a comprehensive, rational process to identify the alternative that best meets the statutory selection criteria. Major tasks associated with the FS include:

- Development of remedial action alternatives;
- Evaluation of remedial action alternatives; and
- FS report.

Development of Remedial Action Alternatives

The development of the remedial action alternatives is summarized in this letter. Remedial action alternatives were developed using the following process:

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Fax 503.320.6918
Tel 503.620.7284

- Summarize the remedial investigation and risk assessment;
- Identify remedial action objectives (RAOs);
- Identify the quantity/location of media exceeding the RAOs;
- Identify general response actions;
- Identify and screen remedial action technologies; and
- Assemble remedial action alternatives.

Evaluation of Remedial Action Alternatives

For each of the potentially feasible remedial action alternatives, the FS will evaluate individual alternatives based on the following (OAR 340-122-085[4]):

- Protectiveness;
- Balancing of remedy selection factors (effectiveness, long-term reliability, implementability, implementation risk, and reasonableness of cost); and
- Treatment of hot spots, if present.

The FS will evaluate the feasibility of treatment of hot spots using the remedy selection factors (listed above) with the higher threshold for cost reasonableness. The higher threshold is applied only so long as the hot spot exists. Once the hot spot is eliminated, treatment will be evaluated in the same manner as any other alternative.

After the individual evaluation of the alternatives, the FS will include a comparative evaluation of the alternatives to identify the alternative that best meets the evaluation criteria.

Feasibility Study Report

A FS report will be prepared presenting the results of the screening process, final ranking of remedial site alternatives, and the recommended alternative. The FS report will be prepared in general accordance with the following outline:

1.0 Introduction
2.0 Background
3.0 Remedial Action Objectives and Evaluation Criteria
4.0 Area and Volume of Contamination
5.0 Technology Evaluation and Remedial Action Alternatives

6.0 Detailed Analysis of Remedial Action Alternatives
7.0 Comparative Evaluation of Remedial Action Alternatives
8.0 Recommendations and Residual Risk Assessment

DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES

Remedial Investigation

This section summarizes the description and history of the site. A more detailed description of environmental activities and the results of the remedial investigation (RI) conducted at the site are provided in the Terminal 1 South Remedial Investigation Report (Volumes 1 and 2) prepared by Hahn and Associates (Hahn and Associates, 2001a) and the Monitoring Well Installation and Groundwater Sampling Report (Hahn and Associates, 2001b).

Site Description and History. The T1S Site is located at 2100 NW Front Avenue in Portland, Oregon (Figure 1). The site consists of approximately 21 acres that are almost completely paved with asphalt or concrete or covered by buildings (Figure 2). Two primary structures, designated as Warehouse No. 2 and House No. 104, are currently located at the T1S Site. An extensive dock structure is present over submerged lands at Berths 104, 105, and 106.

Historically, Terminal 1 has been used for the staging of lumber, logs, paper products, steel containers, and bagged grain. Various companies have owned or leased portions of the Terminal 1 South Complex (see Remedial Investigation [RI] Report; Hahn and Associates, 2001a). The T1S Site will be redeveloped for residential and commercial purposes.

Environmental investigations conducted at the site identified T1S Site soils and groundwater concentrations exceeding screening levels. Likely or potential sources of contamination include underground storage tanks and dry wells. Petroleum hydrocarbons and metals were identified as contaminants of interest.

Human Health Risk Assessment

Hart Crowser conducted a human health risk assessment (HHRA) and a Level 1 Scoping and Modified Level 2 Screening ecological risk assessment (ERA) for the T1S Site (Hart Crowser, 2002). Potentially exposed populations that were evaluated in the HHRA include future residents, current and future commercial workers, and future utility/excavation workers. Under the future resident and current/future commercial worker scenario, data was evaluated from depth ranges of 0 to 3 feet below ground surface (bgs). For the future utility/excavation worker, data was evaluated from 0 to 15 feet bgs. The site was divided into three Areas of Concern (AOC), and separate risk calculations and risk estimates were conducted for each area. The AOCs are presented on Figure 2. Risk and hazard estimates were evaluated for each area (A, B, or C) and are described below.

Area A Risk and Hazard Estimates

The exposure pathways that were quantitatively evaluated at Area A were soil ingestion, dermal contact with soil, inhalation of volatiles from groundwater, and inhalation of fugitive dust.

Residential. The assessment of risks to residential receptors at Area A indicated that polynuclear aromatic hydrocarbons (PAHs), arsenic, and lead exceeded the DEQ acceptable risk level.

Commercial Worker. For the commercial worker exposure scenario, unacceptable risks were identified for benzo(a)pyrene, arsenic, and lead.

Excavation Worker. For the excavation worker exposure scenario, only lead was present above the acceptable risk level.

Area B Risk and Hazard Estimates

The exposure pathways that were quantitatively evaluated at Area B were soil ingestion, dermal contact with soil, and inhalation of fugitive dust. No VOCs were detected in Area B soil or groundwater.

Residential. The assessment of risks to residential receptors at Area B indicated that benzo(a)pyrene and arsenic exceeded the DEQ acceptable risk level (see below for discussion of arsenic).

Commercial Worker. For the commercial worker exposure scenario, only arsenic exceeded the DEQ acceptable risk level (see below for discussion of arsenic).

Excavation Worker. No unacceptable risks were estimated for the excavation worker exposure in Area B

Arsenic Below Background. Arsenic was identified as a carcinogen resulting in unacceptable risks in Area B for residential and commercial worker scenarios. However, there were no detected concentrations of arsenic in soils in Area B that exceeded the site specific background level of 5.3 mg/kg identified in the RI (Hahn and Associates, 2001). Therefore, the only identified unacceptable risk for Area B resulted from benzo(a)pyrene under the residential exposure scenario.

Area C Risk and Hazard Estimates

The exposure pathways that were quantitatively evaluated at Area C were soil ingestion, dermal contact with soil, and inhalation of fugitive dust. No VOCs were detected in Area C soil or groundwater. Arsenic is the only COPC for Area C. Arsenic was identified as a carcinogen resulting in unacceptable risks in Area C for residential and commercial worker scenarios. However, there were no detections of arsenic in soil (depths 0 to 3 feet bgs) in Area C that exceeded the site specific background level of 5.3 mg/kg identified in the RI (Hahn and Associates, 2001a). Therefore, there are no unacceptable risks for Area C.

Ecological Risk Assessment

The Level 1 Scoping ERA did not identify any ecologically important species or habitats at the T1S Site. The site is almost entirely paved or covered by buildings. The absence of upland habitat indicates there are no complete exposure pathways for terrestrial ecological receptors to come in contact with contaminated soil at the T1S Site.

A Modified Level 2 Screening ERA was conducted on the available groundwater monitoring well data collected at this site. There were no detected concentrations of organic constituents in the seven groundwater monitoring wells that exceeded their corresponding Ecological Screening Benchmark Values (SBVs). There were two metals (copper and lead) detected in groundwater that exceeded SBVs based on the analysis of unfiltered, total metals, but when the same samples were analyzed for dissolved metals, copper and lead were not detected. The dissolved fraction of metals represents the bioavailable fraction in aqueous environmental media. Therefore, it is concluded that there is no potential for adverse ecological impacts to aquatic ecological receptors from the discharge of groundwater to the Willamette River.

Hot Spot Evaluation

As part of the evaluation of alternatives, the feasibility study must distinguish between contamination that does and does not constitute a hot spot (OAR 340-122-085(5), (6), and (7) and OAR 340-122-090(4)). The definition and evaluation of hot spots differs depending on whether water (groundwater or surface water) or media other than water are being considered (media other than water include soil, debris, sediment, wastes, non-aqueous phase liquid, and other materials). Hot spots are defined as specified OAR 340-122-115(31).

For soil, hot spots are defined as locations where there is unacceptable baseline risk, and the contaminant is highly concentrated, highly mobile, or not reliably contained, or where soil contamination could leach to groundwater and cause a hot spot in groundwater. To assess the "highly concentrated" criterion, soil concentration data were compared against concentrations corresponding to 1×10^{-4} risk level or a hazard index of 10 as defined by the risk assessment (i.e., 100 times or 10 times the acceptable risk level for carcinogens and non-carcinogens, respectively). To assess "highly mobile" or "not reliably contained," we reviewed field logs for the presence of free-phase petroleum hydrocarbons.

Hazardous substances (PAHs, lead, and arsenic) are present at the T1S Site. With the exception of two samples, individual carcinogenic risk estimates are less than 100 times the acceptable risk level (1×10^{-4}), and noncarcinogenic risk estimates are less than 10 times the acceptable risk level. Inspection of field logs did not identify indicators of free-phase petroleum hydrocarbons. Samples B-68 and B-92 had benzo(a)pyrene concentrations (7.05 mg/kg and 2.35 mg/kg, respectively) greater than the concentration corresponding to a risk level of 1×10^{-4} (2.1 mg/kg). Sample B-68 also had a lead concentration (6,190 mg/kg) greater than Hot Spot level (4,000 mg/kg). The B-68 and B-92 samples were collected from Area A and Area B, respectively (see Figure 2). In addition, PAHs are relatively immobile and are not likely to migrate (as supported by the lack of detections in groundwater). Therefore, soil hot spots (resulting from two soil samples) are present at B-68 and B-92.

Remedial Action Objectives (RAOs)

Remedial action objectives are specific goals for protecting human health and the environment. The selected remedy must achieve the RAOs. The RAOs were developed based on the standards for protectiveness in OAR 340-122-040(2) and the requirements that hot spots must be treated to the extent feasible. The remedial action objectives are defined to address the unacceptable risks determined by the baseline risk assessment. These risks are reviewed in the section above. In summary, there is an unacceptable risk to human receptors as follows:

Area A

- Future resident or commercial worker dermal contact or ingestion of soil with PAHs, lead, and arsenic; and

- Excavation worker dermal contact or ingestion of soil with lead.

Area B

- Future resident dermal contact or ingestion of soil with benzo(a)pyrene.

Therefore, the remedial action objective is:

- Prevent human contact or ingestion of soil impacted by PAHs, lead, and arsenic above the cleanup levels listed below:

COPC	Residential	
	Remedial Action Levels (mg/kg)	
	Cleanup Level[1]	Hot Spot Level[2]
Lead	400	4,000
PAHs		
benzo(a)pyrene	0.021	2.1
benzo(a)anthracene	0.21	21
dibenz(a,h)anthracene	0.021	2.1
benzo(b)fluoranthene	0.21	21
indeno(1,2,3-cd)pyrene	0.21	21
Arsenic	5.33[3]	38[4]

Notes:

[1] Based on Human Health Risk Assessment (Hart Crowser, 2002), except arsenic (see footnote 3).

[2] Calculated based on 100 times (carcinogens) or 10 times (noncarcinogens) the established Cleanup Level.

[3] Based on Statistical Background Concentration (Hahn and Associates, 2001).

[4] Calculated based on 100 times the acceptable risk level. Arsenic residential soil acceptable risk level is 0.38 mg/kg (Region 9 Preliminary Remediation Goals [EPA, 2000]).

Location and Quantity of Soil Above RAOs

The estimated area and volume associated with soil exceeding the Cleanup or Hot Spot Level will be developed in the FS.

Identify General Response Actions/Screen Remedial Technologies

Initially, technologies associated with a list of general response actions were screened for applicability based on site conditions, contaminant type, and the ability to address the remedial action objective. General response actions are broad categories of remedial measures that address the remedial action objectives. A response action may be a stand-alone remedial action alternative, or a component of a comprehensive alternative. The list of general response actions includes:

- No Action;
- Institutional Controls;
- Removal;
- Containment;
- In-Situ Biological Treatment;
- In-Situ Physical/Chemical/Thermal Treatment;
- Ex-Situ Biological Treatment; and
- Ex-Situ Physical/Chemical/Thermal Treatment

Table 1 lists the general response actions together with representative remedial action technologies. Based on the future site use, and type and extent of contaminant, these remedial action alternatives were screened to identify a list of technologies for a more detailed evaluation. The results of the screening are shown in Table 1 with the shaded options eliminated from further consideration. Remedial action technologies for soil that remained following the initial screening include:

- No action;
- Monitoring of soil;
- Institutional/Engineering controls;
- Cover;
- Soil excavation;
- Off-Site landfill disposal of soil; and
- Thermal desorption.

Several of these technologies are not useable without being combined with other technologies. As appropriate, technologies were combined to form functional alternatives (such as combining excavation with off-site disposal). Monitoring is considered to be part of each alternative except No Action. The No Action alternative is kept through the screening process to serve as a baseline for comparison.

Assemble Remedial Action Alternatives

Technologies remaining after the screening process were assembled into remedial action alternatives. The potential alternatives that will be evaluated in detail in the FS include:

- No action;
- Cover (including hot spot excavation and disposal and institutional/engineering controls to address excavation worker scenario);
- Excavation with off-site landfill disposal; and
- Excavation with thermal treatment.

If we may provide any additional information or clarification of this letter, please call us.

Sincerely,

HART CROWSER, INC.

REGISTERED PROFESSIONAL ENGINEER
15,147 PE
OREGON
OCT. 2, 1990
HERBERT F. CLOUGH
EXPIRES: DEC. 31, 2003

LEVI FERNANDES
Staff Environmental Engineer

HERBERT F. CLOUGH, P.E.
Principal

Attachments:
Table 1 – Initial Screening and Evaluation of Technologies for Soil
Figure 1 – Site Location Map
Figure 2 – Site Plan

REFERENCES

DEQ, 1998. Guidance for Conducting Feasibility Studies. Final. July 1, 1998.

EPA, 1999. Region 9 Preliminary Remediation Goals (PRGs). November, 2000.

Hahn and Associates, 2001a. Terminal 1 South Remedial Investigation Report. July 12, 2001 (Volumes 1 and 2).

Hahn and Associates, 2001b. Monitoring Well Installation and Groundwater Sampling Report. December 19, 2001.

Hart Crowser, 2002. Human Health and Ecological Baseline Risk Assessment, Terminal 1 South. Portland, Oregon. January 18, 2002.

Table 1 - Initial Screening and Evaluation of Technologies for Soil
Feasibility Study
Terminal 1 South
Portland, Oregon

General Response Action	Technology	Description	Effectiveness	Screening Comments
NO ACTION	None	No Action	Not Effective	Retained as a baseline for comparison.
INSTITUTIONAL CONTROL	Access Restriction	Restrict access with physical and/or legal barriers.	Effective at preventing direct contact.	Applicable in conjunction with other technologies.
	Monitoring	Laboratory analyses of soil samples.	Effective for documenting conditions and concentrations of contaminants remaining in the soil.	Applicable to document effectiveness of other treatment technologies.
REMOVAL	Excavation	Removal of contaminated soil, using conventional equipment or specialized methods where needed.	Effective to depths of up to 20 to 30 feet, but may require dewatering and/or shoring for depths over a few feet.	Applicable to shallow source soils.
	Disposal	Disposal of excavated soils in suitable landfill.	Effective, but does not reduce volume or toxicity of contamination.	Applicable for handling excavated soils. May have future liability.
CONTAINMENT	Cover	Cover area of contaminated soil with impermeable (or semi-permeable) cover.	Effective at preventing direct contact. May reduce mobilization of contaminants (reduction of precipitation infiltration).	Applicable to minimize direct contact with contaminated soil.
IN-SITU BIOLOGICAL TREATMENT	Bioventing	Delivering oxygen to contaminated (unsaturated) soils by forced air movement to stimulate biodegradation.	Effective for non-chlorinated hydrocarbons or vinyl chloride. May interfere with anaerobic activity.	Incompatible with site-specific contaminants.
	Enhanced Bioremediation	Adding nutrients, electron donors, or other amendments to enhance bioremediation.	Effective with addition of suitable amendments, usually in conjunction with source removal. Difficult to ensure adequate coverage.	Applicable for limited treatment of PAHs; metals not addressed.
	Land Treatment	Combination of aeration (tilling) and amendments to enhance biodegradation in surface soils.	Effective for shallow (surface) contamination with addition of suitable amendments. Requires sufficient access for soil/equipment movement.	Incompatible with anticipated future site use.
	Natural Attenuation	Using natural processes to reduce contaminant concentrations to acceptable levels.	May be effective, especially in areas of low concentrations (near plume boundaries), but is dependant upon site conditions. Usually in conjunction with source removal.	Not suitable for short-term remediation of source area. Not applicable to metals or heavy hydrocarbons.
	Phytoremediation	Using plants to remove, transfer, stabilize, or destroy contaminants in soil.	May be effective for shallow contamination with concentrations below toxic thresholds for selected plants. Requires surface area suitable for plant growth.	Incompatible with anticipated future site use.
IN-SITU PHYSICAL/ CHEMICAL/ THERMAL TREATMENT	Electrokinetic Separation	Use of electrochemical/electrokinetic processes to desorb and remove metals and polar organics.	Can be effective in low permeability soils (clays) with highly polar contaminants. Used in conjunction with other removal technologies (such as groundwater pumping) to extract mobilized contaminants.	Ineffective with the combination of coarse grained site soils and low levels of contamination.
	Fracturing	Development of cracks in low permeability or over-consolidated soils to create passageways that increase the effectiveness of other in-situ processes and extraction technologies.	Effective in increasing influence radius of other in-situ technologies. May bypass significant contamination between cracks.	Not necessary with site soil conditions. Difficult to remove contaminants in non-fractured zones.
	Soil Flushing	Circulation of water (or water + additive) through contaminated soil mass. Recovered water is treated and recycled.	Most effective in treatment of inorganic contaminants. Use of surfactants to increase organic solubility may alter physical/chemical properties of soil system.	Less effective for organic contaminants.
	Soil Vapor Extraction	Application of a vacuum in extraction wells to induce gas-phase volatiles to be removed from the soil.	Effective for the removal of volatile organics. Less effective in fine-grained soils.	Incompatible with site-specific contaminants.
	Solidification/ Stabilization	Physically binding contaminants within a stabilized mass or inducing chemical reactions that reduce mobility.	Can be effective at reducing migration/toxicity of contaminants. Chemical additives may have long-term leaching issues or incompatibilities with polynuclear aromatic hydrocarbons or metals.	Difficult to ensure complete coverage.
	Thermally Enhanced Soil Vapor Extraction	Applying heat (steam, hot air, heating units, directed energy) to increase volatilization rate of less volatile chemicals.	Effective for increasing usability of SVE for low volatility compounds. High moisture content or saturated conditions will decrease effectiveness.	Incompatible with site-specific contaminants.

Please refer to note at end of table.

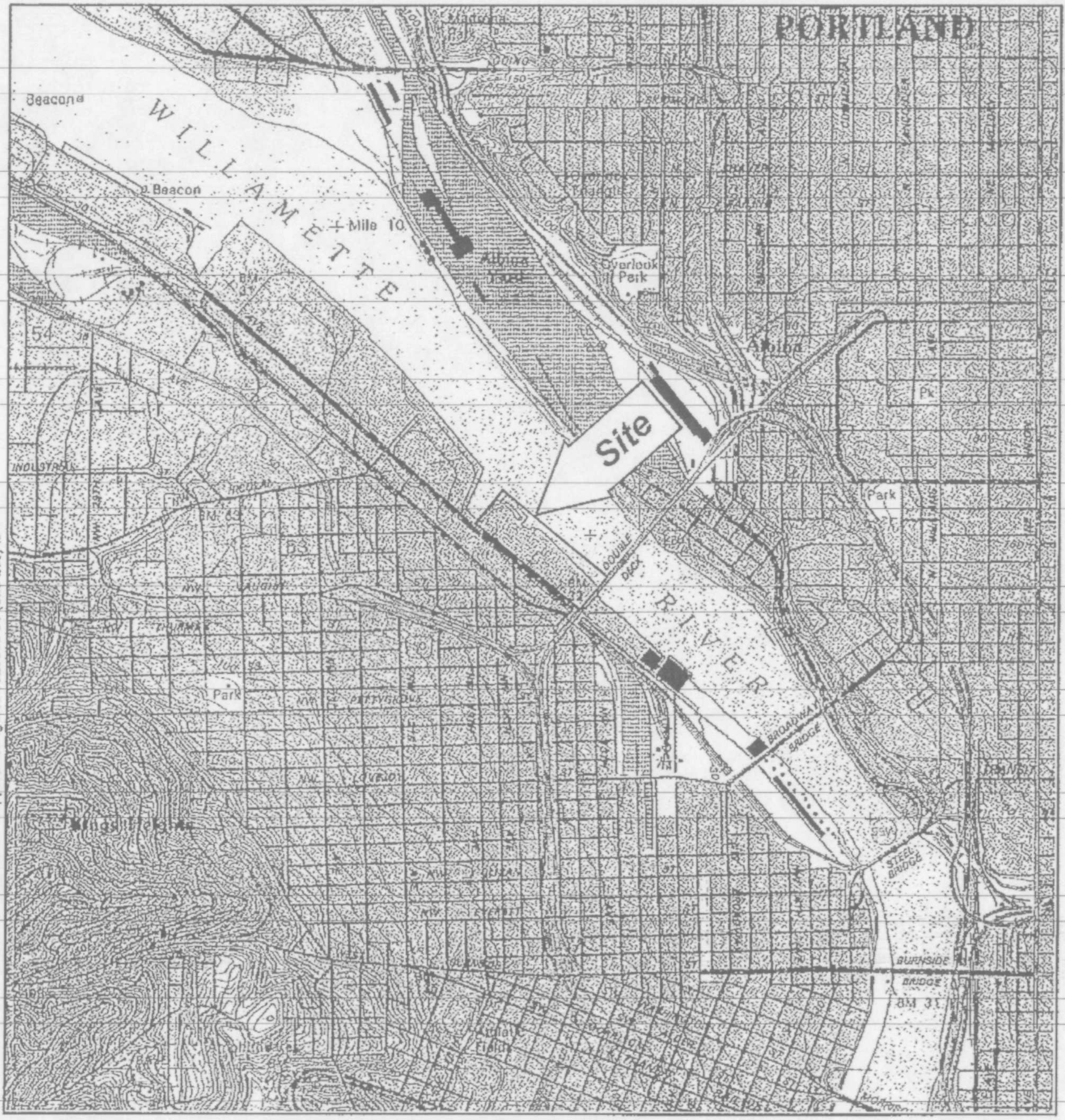
POPT1S601003

Table 1 - Initial Screening and Evaluation of Technologies for Soil
Feasibility Study
Terminal 1 South
Portland, Oregon

General Response Action	Technology	Description	Effectiveness	Screening Comments
IN-SITU PHYSICAL/ CHEMICAL/ THERMAL TREATMENT (CONTINUED)	Chemical Reduction/ Oxidation	Chemically converts hazardous contaminants to less toxic compounds.	Effective in destroying organic contaminants (including free product) and oxidizing inorganic contaminants to less toxic/less mobile forms. Difficult to provide adequate coverage in subsurface.	Applicable for treatment of PAHs; metals not addressed. Insufficient overburden pressure for injection of oxidant (majority of contamination within 3 feet of ground surface).
EX-SITU BIOLOGICAL TREATMENT	Biopiles	Mixing soil amendments into excavated soil and placing in aerated piles.	Effective at removing many organic contaminants from excavated soil. Requires excavation of soil and area for both soil piles and pile handling.	Land use requirements are not compatible with anticipated future site use.
	Composting	Excavated soil is mixed with bulking agents and organic amendments to promote microbial activity.	Effective at removing many organic contaminants from excavated soil. Requires excavation of soil and area for both soil piles and pile handling.	Land use requirements are not compatible with anticipated future site use.
	Landfarming	Excavated soil is placed in lined beds and periodically tilled to aerate the soil.	Effective at removing many volatile organic contaminants from excavated soil. Bioactivity is uncontrolled and less effective. Requires excavation of soil and area for both soil piles and pile handling.	Land use requirements are not compatible with anticipated future site use.
	Slurry Phase Biological Treatment	A slurry of soil and water with additives is continuously mixed to keep solids suspended and microorganisms in contact with soil contaminants.	Effective at removing many organic contaminants from excavated soil. Requires excavation of soil and area for both soil piles and pile handling. Wastewater requires additional treatment.	Handling of slurry and wastewater is complicated and expensive. Land use requirements are not compatible with anticipated future site use.
EX-SITU PHYSICAL/ CHEMICAL/ THERMAL TREATMENT	Chemical Extraction	Excavated soil is mixed with an extractant which dissolves the contaminants. The resultant solution is placed in a separator to remove the contaminant/extractant mixture for treatment.	Can be effective in removing most organic contaminants from soil. Difficult to remove all contaminant/extractant mixture from soil; would likely require finish treatment. Contaminant/extractant requires additional treatment.	Not as effective for relatively low levels of PAHs and metals found in site soils since additional treatment would be required for both soil and recovered extractant.
	Chemical Reduction/ Oxidation	Chemically converts hazardous contaminants to less toxic compounds.	Effective in destroying organic contaminants (including free product) and oxidizing inorganic contaminants to less toxic/less mobile forms. Difficult to provide adequate coverage in subsurface.	Space requirements for reactor and soil handling not compatible with anticipated future site use.
	Dehalogenation	Reagents are mixed with excavated soils contaminated with halogenated organics.	Most suited to the treatment of halogenated semi-volatile organics and pesticides.	Incompatible with site-specific contaminants.
	Soil Washing	Contaminants are separated from the excavated soil with wash water supplemented with additives to help remove organics.	Most suited to the treatment of semi-volatile organics, metals, and fuels. Recovered wash-water requires additional treatment.	Additional treatment would be required for recovered wash-water.
	Soil Vapor Extraction	Application of a vacuum in a network of above-ground piping to induce gas-phase volatiles to be removed from the soil.	Effective for the removal of volatile organics. Less effective in fine-grained soils.	Incompatible with site-specific contaminants.
	Solar Detoxification	Contaminants are destroyed by photochemical and thermal reactions using ultraviolet energy in sunlight.	Can be effective for the detoxification of many organic compounds. Requires suitable climate and adequate space.	Land use requirements are not compatible with site space restrictions. Climate not suitable for long-term soils exposure.
	Solidification/ Stabilization	Physically binding contaminants within a stabilized mass or inducing chemical reactions that reduce mobility.	Can be effective at reducing migration/toxicity of contaminants. May be required to allow off-site disposal.	May be required in conjunction with landfill disposal, depending on condition of excavated soil. Not likely required for disposal.
	Thermal Desorption/ Pyrolysis/ Hot Gas Decontamination	Waste soils are heated to either volatilize (desorption and hot gas) or to anaerobically decompose (pyrolysis) organic contaminants. Off-gas is collected and treated.	Effective in the treatment of soils contaminated with volatile organics. Limitations exist on contaminant concentrations, especially for chlorinated hydrocarbons.	Facilities exist that can thermally treat excavated soil. Acceptability will depend on concentration of metals in excavated soil (limited by the treatment facility).
	Incineration	High temperatures are used to combust organic contaminants.	Effective in the treatment of soils contaminated with volatile organics.	Facilities exist that can incinerate excavated soil containing petroleum hydrocarbons, but are very distant from the site and quite expensive. Not required to treat TPH soil.

Note:
1. Shading represents technologies that have been eliminated from consideration.

Site Location Map
Terminal 1 South Feasability Study
Port of Portland, Portland, Oregon



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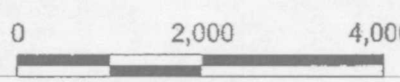
Note: Base map prepared from the USGS 7.5-minute quadrangle of Portland, OR dated 1990.



Scale in Feet
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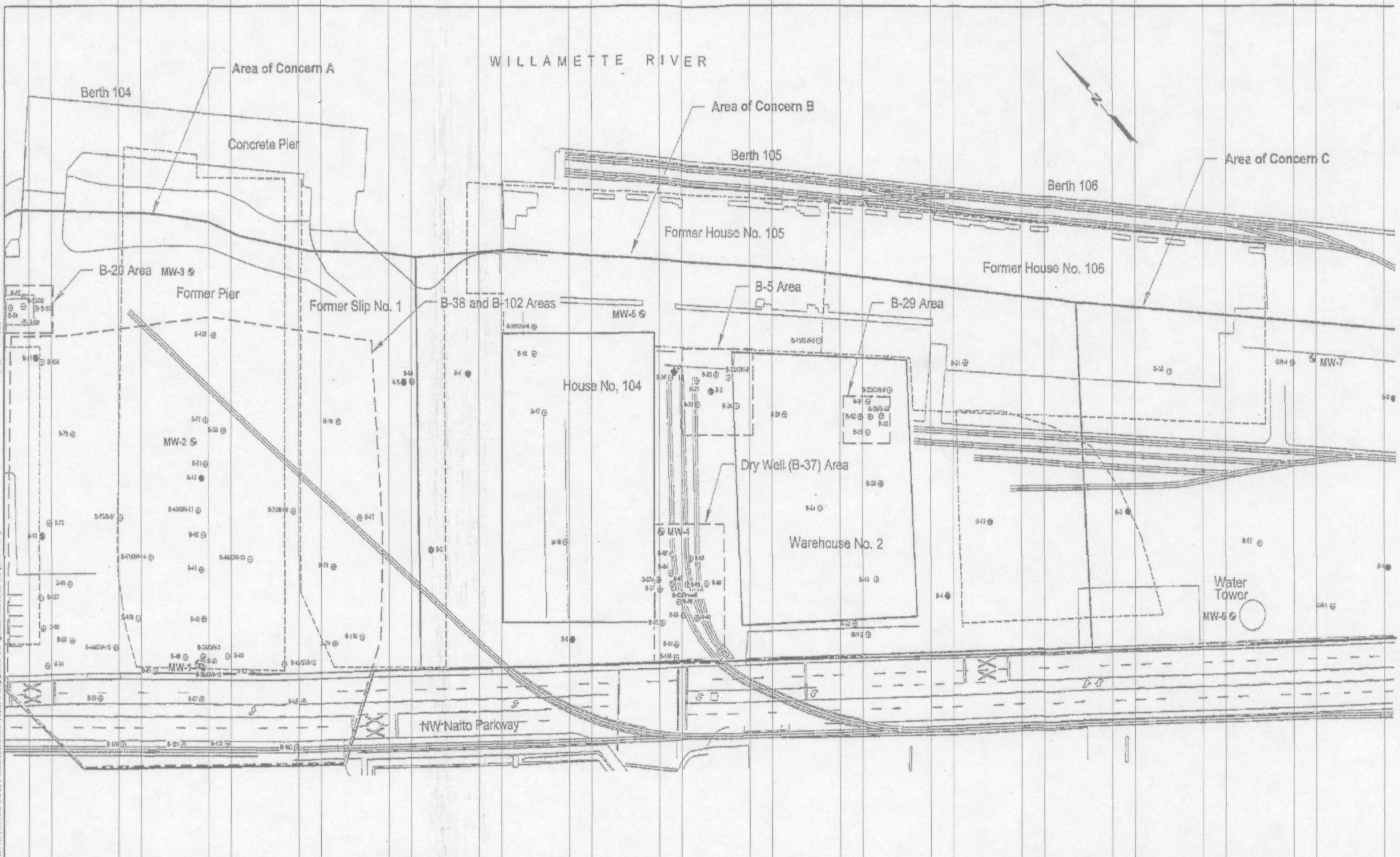
Figure 1

Site Plan
Terminal 1 South Feasability Study
Port of Portland, Portland, Oregon



Note: Base map prepared from an AutoCAD file provided by Olson Engineering, 8/27/01.

Legend:

Maul Foster and Alongi, Inc. Push Probe Boring Location and Number (March 1998)

MW-1 HAI Monitoring Well Location and Number (2001)

HAI Push Probe Boring Location and Number (2000)

0 100 200
Approximate Scale in Feet

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Figure 2

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